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PATHOLOGICAL ANATOMY

A Text-Book of Pathological Anatomy and Pathogenesis.
By Ernst Ziegler. Translated and Edited for English
Students by Donald MacAlister, M.A., M.B., St. John's
College, Cambridge. 8vo. (London: Macmillan and
Co., 1883.)

FOR some years the student of medicine has felt the want of an English manual of modern Pathological Anatomy. He has been compelled either to trust entirely to his teacher, or to consult works and memoirs little adapted for beginners. This felt want the English edition of Ziegler's Pathology, when completed, will in great part meet. The author believing "that the learner gains a readier grasp of his subject when it is first presented to him as a uniform and coherent system of doctrine," has, by avoiding "much matter of controversy," succeeded in making a clear and concise statement of each subject treated. In this the author has been well seconded by the editor, who, by carefully revising and amending the original, by adding numerous references to English and French memoirs, and by otherwise with characteristic ability adapting the work for English readers, has greatly enhanced its value.

Although the authors have kept the student chiefly in view in preparing this manual, a glance at the small print and the numerous references given, will at once prove that those desirous of gaining an exhaustive knowledge of the subject, and those engaged in special investigations, have not been neglected. It seems to us that this is by far the best plan for a text-book. It is to be regretted that students at the present day read so little. In many instances they content themselves with "learning" in order afterwards to retail what they purchase from their teachers; or what is worse, when they are unfortunate enough not to have their teacher as one of their examiners, they "get up" an endless number of often useless facts, derived from all possible sources, before presenting themselves for examination. This waste of time and energy in great part results from the want of good text-books. The books available are generally too large, they are often quite beyond the grasp of the beginner, and at the same time not a little out of date. In order to be able to utilise fully the opportunities now offered for gaining a practical knowledge of pathology, and other allied subjects, lectures are not enough; there must be something to fall back upon, by means of which the impressions received from the teacher may be tested, something that will form a foundation on which an intelligent knowledge of the subject may be built. We believe that the work before us will serve this purpose, and that it will be equally useful to the teacher by enabling him to take for granted that the fundamental facts of his science can be again and again referred to as the student requires, and by providing short, concise statements which he can modify at will, and to which he can add much that is of historical interest, or that is too recent for any manual, however complete, to contain.

The volume now published deals with General Pathological Anatomy. It is divided into seven sections. Those

on Malformations, Inflammation, Tumours, and Bacteria deserve especial mention. In treating these subjects the authors have been careful to avail themselves of all the recent investigations, not only in Pathology, but also in Embryology and other branches of Biology, and by making free use of small print and giving abundant references, they have succeeded in drawing up a more complete account than exists in any other English manual.

In a very suggestive introductory chapter some of the special terms used by pathologists are defined, and the functions of pathological anatomy indicated. In the section on the Formative Disturbances of Nutrition the researches of Strasburger and Flemming on the changes in cells and nuclei during subdivision are considered, and a diagram showing indirect cell-division is introduced. In speaking of cell-multiplication it is pointed out that the proposition, "The stronger the external stimulus the greater the proliferation," cannot be accepted; that "one can at most admit that very slight stimuli, sufficient merely to excite the cell without injuring it, may perhaps call into play its power of multiplication; but nothing has been experimentally established concerning the nature, the action, or the mode of application of such stimuli"; further, that "when the nutritive and formative activities of a cell are morbidly increased, the effect is due to augmentation of the physiological stimuli or diminution of the physiological resistances to growth, or the direct influence of external stimuli"; the factors probably favouring proliferation being (1) an increased capacity in the cell to assimilate nutriment, (2) an increased supply of nourishment, (3) the removal of the normal checks to growth. In the same chapter there is an account of the origin of epithelium, fibrous and adipose tissue, and of new blood-vessels; and, in the chapter immediately following, an account of the origin of pus-corpuses and of the mode in which tissues are regenerated.

Tubercle and other allied diseases, such as lupus, leprosy, and glanders, are spoken of as "Infective Granulomata." A tubercle is defined from a histological point of view as "a non-vascular cellular nodule which does not grow beyond a certain size, and at a certain stage of its development becomes caseous"; but it is afterwards pointed out that when Koch's recent investigations are taken into consideration it must be spoken of as "a cellular nodule containing within it the specific tuberculous virus, the bacillus tuberculosis."

Among these infective granulomata we have the new disease known as "actinomycosis," which is associated with the presence of the peculiar fungus *Actinomyces*. In this disease the infection probably starts from the mouth, and results in the formation of granulations and fibrous tissue and in suppuration.

The classification of tumours has long been a puzzle to pathologists. Later writers have more and more recognised their relation to the embryonic layers, and now we have, we believe for the first time in an English text-book, a purely embryological arrangement, tumours being divided by the authors into: (1) those derived from the mesoblast—the connective-tissue tumours; (2) those containing elements derived from epithelial cells—the epithelial tumours. This classification, which commends itself by its simplicity, is likely to be generally adopted.

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The consideration of the different kinds of tumours is followed by a chapter on their ætiology, in which Cohnheim's embryonic hypothesis is discussed at some length, and the objections to its general acceptance pointed out. In answer to the question, How does the tumour assume properties distinct from those of its surroundings? there is as a reply, "We believe that the phenomenon is ultimately due to some change affecting individual elements of a tissue whereby they are rendered dissimilar to their neighbours." The change is manifested especially in this—that the normal checks to the indefinite growth of the proliferous cells are inoperative or inadequate, either because the formative and productive energy is increased, or because the restraining influence of the surrounding structures is diminished, or from both causes together.

The last section of the present volume is devoted to Parasites. On comparing the German account of animal parasites with the English, we note very considerable additions and improvements. The chapter contains a sufficiently complete account of the structure and life-history of the ordinary parasites for all practical purposes. The chapter on Bacteria is extremely valuable. The editor has been careful to incorporate in the text all the important recent discoveries, and references are given to all the memoirs that the student or investigator is likely to require to consult. We thus have in a connected form the results of numerous inquiries into the nature of the organisms which for some time have been claiming not a little of the attention of biologists and physicians. In describing the bacteria, reference is made to the influence of temperature and of the surrounding medium on their growth and development, also to the influence they exercise on the nutrient liquid, and to their presence without and within the living body.

In reference to the existence of bacteria within the body we read:—

"Bacteria are perpetually entering the body with the food we eat and the air we breathe. They must, therefore, be at times found in the tissues, especially in places where access is direct. The fact that they are not easy to demonstrate is readily explained. It must be only a small number that are able to multiply in the tissues they have penetrated; the majority must quickly perish." Bacteria are described as pathogenous and non-pathogenous, the latter being harmless unless the normal secretions undergo some alteration, or the bacteria develop to an unusual extent. Under such conditions, inflammation may be set up, or the whole system may be influenced by the absorption of the soluble products of decomposition, some of which are extremely poisonous, and capable according to Hiller, of altering or even destroying the tissues exposed to them. "The pathogenous bacteria have the power of settling, not merely in the ingesta and secretions, or in dead tissue, but also in living tissue. This happens chiefly in the mucous membranes and in the lungs. The uninjured skin is protected against invasion by the horny epidermis."

"Many of the bacteria can settle in perfectly healthy mucous membranes. In the case of others we must imagine that they do not find a proper soil for their development, unless the mucous membrane is injured or altered. Of course injury or alteration of this kind may seem to make the outer skin or any other accessible

tissue the starting-point of a bacterial invasion (wound-infection). All that is necessary is that a bacterium should reach a spot that affords the conditions of its development. If this occurs, it multiplies and forms colonies or swarms. These may, according to the species of the fungus and the nature of its soil, remain in aggregation, forming heaps or masses, or may spread through the tissues. Such a settlement is never without effect on the affected tissues. The bacteria may force their way into the substance of the constituent elements, and especially into the tissue-cells, which are sometimes found to be crammed with bacteria."

All that is necessary is that a bacterium should reach a spot that affords the conditions for its development, *i.e.* "the temperature of the body must be such as favours its development; it must be able to abstract fit nutriment from the tissues in which it settles; it must nowhere encounter substances which check or injure it." When in the tissues, the increase of the bacteria may be arrested by the aggregation of living cells resulting from the inflammation they set up, assisted by the regenerative action of the fixed tissue-cells. If this does not happen, they spread into the surrounding tissues, usually reaching the lymphatics and blood-vessels, some to perish, others rapidly to multiply.

The bacteria are supposed to lead to disease by withdrawing nourishment, setting up chemical changes—partly by their direct action on the nutrient material, and partly by the action of the unorganised ferments they form; and finally, as a result of these changes, by producing poisonous matters. In doing this they enter into conflict with the tissue-cells, influencing their nutritive activity, changing them or even leading to their destruction. Whether it is a change in the fermentive action of the cells, or a disturbance of the functions of the central nervous system which leads to fever, has not been determined. Neither is it known whether the unsusceptible condition of the tissues which usually follows when the bacteria have been eliminated, results from "a modification in the chemical constitution of the tissues, or to a change in the vital activity of the cells."

In referring to the relation of bacteria to infective diseases it is stated "that among the infective diseases there are certainly some which are due to the invasion of a microphyte, and that it is highly probable the others have a like origin." This chapter further gives a short account of the various diseases which have been described as resulting from the influence of bacteria, and concludes by discussing the burning question of the present moment—the mutability of bacterial species. It is well known that Naegeli, Buchner, and others believe "that both the morphological and the physiological characters of the bacteria are mutable"; that "a given bacillus does not invariably produce bacilli of the same structure, and does not always pass through the same developmental stages." "A bacterium which, under given conditions, gives rise to a definite kind of fermentation, may lose this property when cultivated under different conditions." Koch and others believe that bacteria do not alter in their properties, and that "even when the nutrient medium is altered from time to time no recognisable differences are produced."

The authors point out that "at present we are unable

to draw any certain conclusion regarding the relation of non-pathogenous to pathogenous bacteria. Clinical experience would indicate that the activity of the infective virus may vary within certain limits. And we must apparently admit that the infective bacteria have not always possessed their noxious qualities, but have acquired them somehow in the course of ages. But this is not enough to convince us that harmless bacteria can acquire infective properties rapidly. . . . We may therefore provisionally conclude that the transformation of innocuous into noxious bacteria can occur but rarely, and under special conditions."

Recent work both in this country and on the Continent seems to go against the mutability theory, and in all probability it will soon be made clear that Buchner's experiments are capable of another interpretation from that hitherto adopted.

Enough has been said to indicate that the English edition of Ziegler's Pathology will not only prove of immense help to the student, but that it will also be invaluable to the practitioner. It is to be hoped that the second part, on Special Pathological Anatomy, will soon appear, and that it will equally commend itself to English readers.

The numerous woodcuts with which the work is illustrated are beautifully distinct, the type and paper are everything that could be desired, and so successful has the editor been that there is no evidence of the greater part of the work being a translation.

ENSILAGE

Ensilage in America. By James E. Thorold Rogers, M.P. (London: W. Swan Sonnenschein and Co., 1883.)

PROFESSOR ROGERS has contributed a most interesting little book on *Ensilage in America*. He has no doubt been serviceable to his country in drawing public attention to a subject of importance; but like most persons who focus their eyes upon a single point, he has lost the due proportion in which it stands to its background, foreground, and surroundings. Perhaps this may be forgiven as a common fault, or it may be the secret of strength, in all propagandists. Be this as it may, it is a marked feature in the volume before us. *Ensilage* is to be the temporal salvation of the farmer. The Professor appears to have been carried away on the full tide of American enthusiasm, buoyed up by a certain youthful airiness scarcely consistent with the gravity of an Oxford Don. He has forgotten the salt, and those who read his book (and we trust they may be numbered by thousands) must add it for themselves.

Ensilage is the preservation of green fodder in its natural succulent condition in pits or *Silos*. These pits must be airtight and watertight, and the fodder must be so well trampled into them and weighted on the top as to arrest fermentation. The theory of the process is that, in the case of fodder so treated, heat is generated and fermentation commences. The small amount of oxygen held in the interstitial air is speedily absorbed, and its place taken by carbonic acid gas. Just as a lighted candle extinguishes itself in a bath of choke-damp of its own making when burnt in a closed vessel: so the fermenta-

tion and its accompanying heat are arrested in the mass of closely packed fodder which is in fact immersed in a bath of carbonic acid, and thus securely protected from ordinary atmospheric action. Well preserved *ensilage* comes out of the pit almost as green and fresh as when it was first put into it, and has acquired a pleasant vinous smell and slightly acid flavour, which has given it its name of *sourhay* in Germany, Austria, and Hungary. The process is at once simple and effective, but is no doubt expensive when carried out upon the scale which a successful experiment demands. Thus the larger the pit the more assured the success, as all the conditions are more perfectly attained. At p. 22 we read: "M. Havemeyer's silos were four—two fifty-nine feet long and fourteen feet wide; and two thirty-five feet long and twelve feet wide, each pair being twenty-five feet deep. They are under the same roof as the feeding barn, where there is standing-room for ninety-eight cows." The pits are bricked and cemented, or built with concrete walls, and they may be carried up higher than the level of the ground, or may be built entirely from the surface. When the ground is naturally dry and of a clayey or close texture the silo need not be lined. It is recommended that a drain should if possible be carried from the bottom of the silo to take off superfluous water. Simple as these directions undoubtedly are, they point to a heavy initial expenditure, only to be recommended after very mature consideration. On the other hand silos of smaller size, as, for example, 22' X 9' X 15' deep and other dimensions, are also mentioned. Still the fact remains that in small silos there is more waste and greater uncertainty. Also that for practical purposes a small silo would be of little value. The process of storing the fodder is very easy to understand. It is, in the case of green maize, cut up with a powerful chaff-cutter, trampled into the pit by men or horses, and when the space is filled it is covered with boards and weighted down with boxes of stone or earth to a pressure of about 100 lbs. per square foot. The fodder settles down under pressure, and is found after several months to be perfectly palatable and fresh.

Such is the process which Prof. Rogers now lays before the British public with the strongest possible recommendations. Not only so, but with threatenings or at least warnings also, for we are told that "if the New Englanders and New Yorkers succeed in extending their *ensilage* system, they will strive to find a foreign market for their increased produce." This process, it is urged, is entirely to revolutionise agriculture. It is to be a new point of departure, a "new dispensation." "Is there not a bonanza (a mining term for peculiarly rich ore) in the farms with this new enterprise? Will it not give the farmer such profits, with less labour, as will enable him to be more independent? Is it not going to create new interests with our sons, when they can find a more profitable employment, with less hard labour than can be found in any business in our cities?" It is to double the population of "our New England cities," and indeed appears to be a veritable *El Dorado* for farmers.

In thus introducing *ensilage* to the attention of his countrymen, Prof. Rogers is scarcely cautious in the manner in which he discounts the value of scientific and especially of chemical opinion upon this subject. "*Ensilage* is to be the food of the future for pigs and poultry